Application

for

United States Patent

To all whom it may concern:

Be it known that We,   James W. Morton, and

     William T. Brown

have invented certain new and useful improvements in:

COMMUNICATION SYSTEM WITH WIRELESS ELECTRONIC MAIL OR MESSAGING INTEGRATED AND/OR ASSOCIATED WITH APPLICATION PROGRAM RESIDING ON REMOTE COMPUTING DEVICE

of which the following is a full, clear and exact description:

COMMUNICATION SYSTEM WITH WIRELESS ELECTRONIC MAIL OR

MESSAGING INTEGRATED AND/OR ASSOCIATED WITH APPLICATION

PROGRAM RESIDING ON REMOTE COMPUTING DEVICE

5   RELATED APPLICTIONS

     This application claims priority from U.S.
Provisional Application serial number 60/222,036, filed
on July 31, 2000, entitled "Communication System with
Wireless Electronic Mail Integrated and/or Associated
10   with Application Program on Remote Computing Device",
incorporated herein by reference.

BACKGROUND OF THE INVENTION

    Field of the Invention

15   The present invention generally relates to wireless
communications and, more particularly, to a wireless
communications system that enables a user to send data
pertaining to the shipment and/or delivery of goods via
a wireless transmission to, for example, a delivery
20   system having at least one data file or data format
associated with at least one application program
residing on a remote computing device.

    Background of the Related Art

25   Mobile communications are a widely used throughout
the world for remote communication. E-mails and phone
calls can be initiated and received on current mobile

communication devices. The present invention applies

various features to the trucking/shipping industry where

remote personnel may communicate information with a

remote computer. This allows information to be

5   transferred more efficiently and quickly than existing

methods.

Currently, wireless transmission of e-mails is

known. FIG. 1 is a diagram showing the outline of the

whole structure of an automatic data transfer system

10   illustrated in U.S. Patent No. 5,933,478 incorporated

herein by reference. In FIG. 1 number 150 represents a

handheld terminal device, numeral 118 represents a host

computer for the communication with the handheld

terminal device, and numeral 120 represent a public

15   telephone line. In addition numeral 130 represents a

base station for transmitting a message to the handheld

terminal device 150 over radio waves, and numeral 140

represents a handheld phone base station for the

communication with the handheld terminal device 150,

20   over radio waves.

Host computer 118 transmits a message to handheld

terminal device 150 via the base station 130. This

message contains an identifier of a file to be fetched

by the handheld terminal device 150. Upon reception of

25   the message, the handheld terminal device 150 performs

data communications with the host computer 118 by using

a handheld phone function thereof, and fetches the file

(or electronic mail) designated by the message.

A flow diagram of an Automatic Character Format

5   routine is shown in FIG. 2, from U.S. Patent No.

5,621,875 incorporated herein by reference. The

Automatic Character Format routine operates in the

automatic formatting mode to automatically apply the

selected character format to any number of portions of

10   existing text thereafter selected by the user. The

selected character format is so applied until the user

exits the automatic formatting mode or enters new text

from a keyboard. The Automatic Character Format routine

is called by the word processing program and by the Text

15   Entry routine. Whenever the Automatic Character Format

routine is called, the word processing system converts

to automatic formatting mode, if not already operating

therein.

In step 900, the Automatic Character Format routine

20   sets the selected character format to be automatically

applied to the text selected by the user. The routine

sets the character format by storing a status string as

an identifier identifying the selected character format

in the format status field 302 of the text format data

25   structure 300. For example, if a bold character format

has been selected by the user, then the status string

"ON" is stored in the format status field corresponding

to the format option field containing the string "BOLD".

In step 901, the Automatic Character Format routine

5   indicates that a character format has been set to be

automatically applied. The routine indicates this by

displaying the selection cursor in a form specific to

character selection. When a paragraph format is selected

instead of, or in addition to, a character format, the

10   selection cursor 212 is instead displayed in a form

specific to paragraph selection.

Alternatively, the selection cursor contains a

format indication area, and indicates the specifically

selected character format by displaying an appropriate

15   symbol in the format indication area. This symbol could

be a character, such as "I" for italics, or an icon, a

color, etc., as screen space and resolution permits. In

the alternative embodiment wherein multiple text formats

are selected, the multiple character formats would be

20   indicated with multiple symbols in the format indication

area of the text selection cursor, also as screen space

and resolution permits. The format symbol remains

displayed in the format indication area for as long as

the selected text format remains selected to be

25   automatically applied in the automatic formatting mode.

In step 902, the routine determines whether an additional character format has been selected by the user. If so, control branches to step 903, wherein the Automatic Character Format routine is again called to

5 apply the additional character format. If not, control proceeds to step 904, wherein the routine determines whether a paragraph format has been selected by the user. If so, control branches to step 905, wherein the Automatic Paragraph Format routine is called to

10 additionally apply the paragraph format selected. If not, control proceeds to step 906. After performing either the Automatic Character Format or the Automatic Paragraph Format routine, the routine returns.

In step 606, the Automatic Character Format routine

15 determines whether the cancel button, has been selected by the user to cancel the selected character format. If so, the routine branches to step 907 wherein the status strings in the format status fields are removed and the word processing system converts to the conventional

20 mode. The routine then returns. If the Automatic Character Format routine determines in step 906 that the user has not selected the cancel button, then control proceeds to step 906. The routine determines in step 906 whether the user has selected a key on the keyboard to

25 enter new text. If so, control branches to step 609

wherein the routine removes the status strings stored in the format status fields 302 of the text format data structure. Control then proceeds to step 910 wherein the Text Entry routine, is called and the word processing

5   system converts to the conventional mode. The Text Entry routine enters the text into the text document, as has been explained. The Automatic Character Format routine then returns.

If the Automatic Character Format routine

10   determines in step 906 that a key has not been selected, then control proceeds to step 912 wherein the routine determines whether the user has initiated a text selection indicating a portion of text to which to apply the character format selected in the automatic

15   formatting mode.

The user initiates a text selection by moving the mouse 120 to position the text selection cursor 912 on a word displayed on the display, and then depressing the mouse button on the mouse while the text selection

20   cursor is so positioned. If the user has not initiated a text selection, then the routine loops back to step 906 and continues to check for user input in steps 906, 908 and 912. If the Automatic Character Format routine determines in step 912 that the user has initiated a

25   text selection, then control proceeds to step 914. In

step 914, the routine determines whether the user has

clicked the mouse on a single word or dragged the mouse

across multiple words. The user clicks the mouse on a

single word by releasing the depressed mouse button

5   while the text selection cursor is positioned anywhere

on the displayed word. The user drags the mouse across

multiple words by holding the mouse button down and

moving the mouse to move the cursor from anywhere on the

first word initially selected to a position anywhere on

10   a last word to be selected.

If, in step 914, the Automatic Character Format

routine determines that the user has clicked on a word,

then control proceeds to step 916. In step 916, the

routine reads the text format data structure, and

15   formats each character in the word clicked on to have

the text formats indicated in the format status fields

as selected by the user. The formatting of a given

character or set of characters is a conventional

operation well-known to those skilled in the art. An

20   insertion point which defines the location and format of

characters thereafter typed is also formatted to have

the character format selected. The routine then loops

back to step 606 to continue to check for user input.

Thereafter, text entered in step 908 also has the

25   selected character format.

If the routine determines that the user has dragged the mouse across multiple words, control branches to step 918 wherein the routine formats each character in each of the multiple words, from the first to last word

5   selected, to have the text formats indicated in the format status fields as selected by the user. The insertion point is also formatted to have the character format selected. The routine then loops back to step 606 to continue to check for user input. If the user neither

10   clicks nor drags the mouse in step 914, control loops to step 902, and the routine continues to check for user input.

Mobile communications systems are known in the art for providing a communications link between a user of a

15   mobile communications device (e.g., a handheld device) and a stationary base or mobile vehicle. Mobile communication devices can be linked via a network to provide greater range and/or service. One such network is the ARDIS® network ("network") 100 in FIG. 3.

20   Networks of this nature provide secure, portable, two-way communication between handheld wireless data terminals, mobile data terminals, and their respective host computers.

As shown in FIG. 3, the network 100 is a

25   terrestrial wireless two-way data network that allows

subscriber units such as an intelligent terminal or

computing device 102, handheld device 104, or other

communications device 106 to communicate with their

respective host computer 108 and each other without a

5   phone line connection. Subscriber units 102, 104, 106,

therefore, typically have a radio frequency (RF) modem

for sending and receiving signals.

The network 100 has over 1750 base stations 110

providing service to cities and towns throughout the

10   United States, Puerto Rico, and U.S. Virgin Islands.

Each base station 110 covers a radius of approximately

15-20 miles. The base stations 110 are radio frequency

towers that transmit or receive radio signals between

subscriber units 102, 104, 106 and the Radio

15   Frequency/Network Control Processors (RF/NCPs) 112.

Base stations 110 transmit and receive radio signals,

preferably using a narrow band FM transceiver operating

in the 800 MHz frequency band. There are separate

frequencies for the transmit path and the receive path;

20   together these two frequencies represent a full duplex

channel that normally transmits data at 4800 bps in both

directions. In operation, for a message "inbound" to

the network 100 from a subscriber unit 102, 104, 106,

the signal is "heard" by the base stations 110 and sent

25   over a phone line 116 to a RF/NCP 112. The network 100

employs an automated roaming capability that allows the

free movement of subscriber units 102, 104, 106 between

cities and between multiple channels within a given

city. This capability allows the subscriber units 102,

5   104, 106 to freely move (roam) across the country and

take advantage of all the network 100 services that are

available in every locale.

The RF/NCPs 112 are high-speed computers that

interconnect multiple base stations 110 with the ARDIS®

10   Service Engine(s) (ASEs) 114. A number of RF/NCPs 112

are located together serving a particular geographical

area, each being connected by high speed digital phone

service to one of the ASEs 114, which route messages to

a destination such as a customer host computer 108 that

15   is directly connected to the network 100 by, for

example, a leased telephone line or a value added

network. RF/NCPs 112 pass information relating to

source, destination and length of each message to an ASE

114 that enables the network 100 to do network analysis

20   of traffic density in, for example, each city. An ASE

114, in turn, passes information back to a RF/NCP 112

concerning whether the subscriber unit 102, 104, 106 is

properly registered to the network 100 and, if so, what

level of service is provided to the respective

25   subscriber unit 102, 104, 106. The RF/NCPs also help

manage the roaming capability of the network 100.

Subscriber units 102, 104, 106 can automatically move

(roam) between any of the network 100 frequencies on

either of the two protocols (MDC 4800 and RD-LAP19.2),

5   or between any of the configured network 100 layers that

have been configured for in-building or on-street usage.

The ACEs 114 are general purpose computers that act

as the heart of the network 100. The ACEs 114 route

messages to the proper destination, store subscribe

10   registration information including entitlement, and

perform accounting and billing functions. The ACEs 114

also serve as a point of connectivity to customer host

computers 108, perform protocol conversion, and perform

network 100 troubleshooting and test functions. A

15   plurality of ASEs 114 are interconnected through

dedicated leased lines, with alternate paths available

from each switch as a contingency measure against line

interruptions.

The wireline network 116 provides communication

20   between the customer host computers 108, the ACEs 114,

the RF/NCPs 112, and the base stations 110. The

wireline network 116 is equipped with sophisticated

communications equipment that relays customer messages.

This equipment includes intelligent multiplexers,

25   leased telephone circuits, high-speed modems or digital

service units, and modems for both RF/NCP 112 and

customer host computer 108 connectivity.

Presently, however, within the transportation

industry, we have determined that communications systems

5   are not utilized and/or designed to transmit data

pertaining to, for example, the shipment and/or delivery

of goods to a data file, associated with or via an

application program residing on a remote computing

device that facilitates entry of data. A need exists,

10 therefore, for an integrated mobile communications

system that enables a user to send data pertaining to

the shipment and/or delivery of goods via a wireless

transmission to, for example, a destination or file

associated with or via an application program residing

15 on a remote computing device. The present invention

fulfills this need by providing such a system and method

of operation thereof that facilitates entry of data

and/or assists the user of the mobile device and/or

facilitates the transmission of the data throughout the

20 communication system.

SUMMARY OF THE INVENTION

It is a feature and advantage of the present

invention to provide a mobile communications device that

25 transmits data pertaining to the shipment and/or

delivery of goods to a data file or other destination associated with or via an application program residing on a remote computing device and/or the mobile communications device.

5   It is a further feature and advantage of the present invention to enable users to transmit data pertaining to the shipment and/or delivery of goods to a remote computing device while minimizing keystrokes and ensuring data consistency.

10   It is another feature and advantage of the present invention to provide a system and method in which the sequence in which data fields are transmitted by a data transmission device to the remote computing device optionally in a sequence independent manner, thereby

15   facilitating ease of use.

It is yet another feature and advantage of the present invention to enable expedition of order conformation, shipment confirmation, receipt confirmation and/or billing processes in the

20   transportation industry.

It is still another feature and advantage of the present invention to enable shipping and/or cargo capacity of a delivery vehicle to optionally be more closely matched with the quantity and/or volume of goods

25   to be shipped.

It is still another feature and advantage of the present invention to enable off-the-shelf equipment to be used to transmit via a wireless network data pertaining to the delivery of goods that is used by a

5   data file optionally associated with an application program residing on a remote computing device.

It is still another feature and advantage of the present invention to enable the sender of data pertaining to the delivery of goods to optionally

10 receive a return acknowledgment when the transmitted data is processed.

An additional feature and advantage of the present invention is to enable users to integrate data pertaining to the shipment and/or delivery of goods, as

15 desired.

The integrated mobile communications system of the present invention is economical, durable, and easy-to-use. The system is also flexible in that it permits changes with regard to definition of the data fields

20 associated with transmitted data to be instituted typically by users of the system without any significant or any software modification, thereby precluding the need for routine input or assistance from an outside source. It is particularly well-suited to applications

25 in the transportation industry that involve the delivery

of goods, since the mobile communications device

minimizes typing requirements in regard to the shipment

and/or delivery of such goods.

    To achieve these features and advantages, a

5   communication system is provided that transmits data

pertaining to the shipment and/or delivery of goods via

a wireless transmission to a remote computing device,

wherein the data is standardized and integrated into a

data file or other format included or associated with an

10   application program residing on the remote computing

device. The application program can be for example, a

payroll system, a billing system, and the like.

    In accordance with the present invention, the

system comprises a data transmission device, preferably

15   mobile, that uses an autotext feature (e.g., macros,

objects or other programming techniques) to standardize

user entries and minimize user keystrokes. The data

transmission device is used to transmit data to a data

file or other format included or associated with an

20   application program residing on a remote computing

device, while conforming with cost and function

constraints.

    Specifically, an exemplary embodiment of the

present invention includes a handheld data transmission

25   device that sends data via a wireless transmission to a

remote computing device. The transmitted data is

integrated with a data file or standardized with respect

to a predetermined format associated with an application

program residing on the remote device. The present

5   invention thus provides a system and method that

integrates transmitted data pertaining to delivered

goods into a data file or format associated with an

application program residing on a remote device such as

a computer, as opposed to merely transmitting non-

10   standardized data via, say, an e-mail message.

It is also preferred that the data transmission

device contain pre-loaded, standard terms for the

autotext entries (i.e., customized vocabulary), but also

allow end-users to enter their own customized vocabulary

15   on a limited optionally pre-approved basis. The

autotext capability, as will be explained in further

detail herein, enables users in a very simple way to

enter information that a computer on the other end can

reliably understand or parse on a prespecified basis.

20   Users can enter autotext entries directly into the data

transmission device itself, or advantageously download

their customized vocabulary to the data transmission

device.

The invention thus enables data to be entered and

25   transmitted to a remote computing device in a

consistent, cost efficient manner, with minimal

programming or customization on the transmission device

(e.g., eLink or other system).

In a preferred embodiment, a gateway is provided

5   that integrates, formats or prepares the transmitted

data into a data file or other format, message and the

like associated with an application program residing on

a remote computing device such as a general purpose

computer. It should thus be understood that the

10   invention does not merely transmit data via, say, an e-

mail message. Rather, the gateway is used to integrate

that data with a data file or message associated with an

application program residing on the remote computing

device. The remote computing device could be a standard

15   personal computer running in, say a Microsoft Windows or

an NT environment. Alternately, the remote computing

device could equally be a standard minicomputer or

mainframe computer.

The gateway receives the messages from, for

20   example, a network such as the Internet, or a relay

line, and transfers data contained in the messages to a

data file associated with an application program

residing on the remote computing device. At least a

portion of the data fields of a data file associated

25   with the application program residing on the remote

device are populated with at least a portion of the

transmitted data. In a preferred embodiment, the

gateway parses the data, thereby facilitating population

of the data fields of the application program.

5   It is preferred that the gateway reside on the

remote computing device, and comprise a parser that

receives the formatted data sent from a data

transmission device that, as previously discussed,

provides for data consistency. To facilitate parsing,

10   it is preferred that the transmitted data have a

delimiter or other similar marking device or system

placed on either side of the data associated with each

transmitted data field. The delimiter can optionally be

any character the user wants.

15   Further, the invention provides a standardized,

preset autotext vocabulary, as well as the ability for

users to customize autotext entries so they can build

their own vocabularies by either a manual or automated

process. The process can be automated, for example, by

20   installing software that provides this functionality.

The autotext feature minimizes user keystrokes,

standardizes data format, and allows users to send data

associated with data fields in any order desired. Thus,

for example, a user could type in bl, which the autotext

25   feature would expand to bill of lading, and then type in

wgt, which the autotext feature would then expand to

weight. Alternately, the user could input wgt and then

bl, each of which again would be expanded by the

autotext feature. The gateway detects what sequence the

5   fields come in, "grabs" the data in a standardized

manner, and moves it to the proper location (e.g., data

file).

It is preferred that user-entered text data is

automatically converted to all upper case letters to

10   achieve data consistency. Alternatively, all lower case

letters could equally be used, or any combination of

upper and lower case letters. The invention also

advantageously simplifies the entry of numeric data. In

many data transmission devices, a function key or a

15   similar key must be depressed by the user when numeric

data is being entered. The present invention eliminates

the need for this by utilizing the name of the fields in

which the numeric data is to be entered. For example,

in the case of the wgt field, the autotext feature of

20   the present invention knows that numeric data must be

entered, thus relieving the user of having to depress,

for example, a function key or similar key when entering

numeric data. The present invention facilitates or

enables a driver to use the data transmission device by

25   facilitating ease of data entry by, for example,

minimizing typing requirements, and using abbreviations.

Therefore, human to computer interaction is facilitated

by the use of this autotext feature.

The features and advantages of the present

5   invention will be realized by considering the following

conditions particular to the trucking industry. In a

trucking environment, if a company wants to start its

billing process, one of two things must typically be

done. The company can wait until a driver returns from

10   making a delivery and manually submit his billing

information to the billing department (or other

designated department in accordance with company

operations), after which time the billing department

enters the data into the billing system. Secondly, the

15   driver can call and verbally give the information to,

say, a dispatcher, who subsequently enters it into a

computer system. Both of these ways are time consuming

and/or tend to occur late in the day. In addition, we

have determined that these methods have resulted in

20   various data formats that has created much confusion,

and time-consuming efforts in utilizing data entered by

drivers or field personnel.

With the present invention, data can be provided in

more timely fashion, and in a consistent format. A

25   driver can thus transmit the data immediately after a

delivery at, say, 1:00 PM and have the data integrated

into the data fields of the application program

associated with or residing on a remote computing device

shortly thereafter instead of having to wait for the

5   data to be entered when the driver returns at, say, 5:00

PM. The invention thus would provide, for example, a

four hour head start in the billing process.

The present invention thus facilitates advance

planning, so that the logistical aspects of matching up

10   trucking (i.e., shipping/cargo) capacity for a given

shipment to a given destination at a given time can be

better accomplished. This advantage will be realized by

the data transfer system of the present invention that

ensures data consistency built around communications

15   and, enhanced or modified autotext features.

In accordance with the present invention, the

wireless communication system includes a portable data

transmission device. The device allows the user to

enter data into a predefined data field. Each predefined

20   data field corresponds to a user defined representation

of a word or phrase. The predefined data field and the

data associated with the format are defined using a

standard format. Connected to the transmission device

is a remote computing device which receives the

25   predefined data field and associated data. The remote

computing device process the received data using an

application program stored on the remote computing

device. The standard format is defined so the

application program is able to receive the data. The

5   transmission device and remote computer are connected to

a network. The network transmits the data from the

transmission device to the remote computing device.

The standard format comprises a bill of lading, a

weight, a shipper zip, a consignee zip, a number of

10   pieces shipped, a delivery date, a name of an individual

who signed a delivery receipt, a product number, an

indication that the goods are delivered, an indication

that the goods are picked up, an estimated time of

arrival, a comment, an indication that a trailer is

15   being dropped off, an indication that a trailer is being

picked up, a drop/hook indication, and an indication

that the goods are at least one of over, short and

damaged.

The remote computing device verifies the user has

20   entered a valid predefined data field prior to

transmission. The remote computing device verifies that

data received is valid and complete prior to using the

transmitted data.

There has thus been outlined, rather broadly, the

25   more important features of the invention in order that

the detailed description thereof that follows may be

better understood, and in order that the present

contribution to the art may be better appreciated.

There are, of course, additional features of the

5   invention that will be described hereinafter and which

will form the subject matter of the claims appended

hereto.

In this respect, before explaining at least one

embodiment of the invention in detail, it is to be

10   understood that the invention is not limited in its

application to the details of construction and to the

arrangements of the components set forth in the

following description or illustrated in the drawings.

The invention is capable of other embodiments and of

15   being practiced and carried out in various ways. Also,

it is to be understood that the phraseology and

terminology employed herein are for the purpose of

description and should not be regarded as limiting.

As such, those skilled in the art will appreciate

20   that the conception, upon which this disclosure is

based, may readily be utilized as a basis for the

designing of other systems and methods for carrying out

the several purposes of the present invention. It is

important, therefore, that the claims be regarded as

25   including such equivalent constructions insofar as they

23

do not depart from the spirit and scope of the present invention.

Further, the purpose of the foregoing abstract is to enable the U.S. Patent and Trademark Office and the

5   public generally, and especially the scientists, engineers and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection the nature and essence of the technical disclosure of the

10   application. The abstract is neither intended to define the invention of the application, which is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

These together with other objects of the invention,

15   along with the various features of novelty which characterize the invention, are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and the specific

20   objects attained by its uses, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The Detailed Description including the description of a preferred structure as embodying features of the invention will be best understood when read in reference to the accompanying figures wherein:

Figure 1 is a schematically simplified representation of the ARDIS® network;

Figure 2 is a diagram showing the outline of the whole structure of an automatic data transfer system of handheld device;

Figure 3 is a flow diagram of a Text Entry routing procedure;

Figure 4 is a schematically simplified representation of a communications system according to the present invention;

Figure 5 is a flow diagram illustrating a preferred method of the invention;

Figure 6 is a flow diagram of the process to transmit data pertaining to the shipment of goods;

Figure 7 is a table showing autotext tips for a particular transmission device;

Figure 8 is a simplified block diagram of the combined agent/messenger system;

Figure 9A is a simplified representation of the Post Office Protocol (POP) software architecture;

Figure 9B is a detailed representation of the POP software architecture;

5   Figure 10 is a block diagram of the combined agent/messenger system and POP software architecture; and

Figure 11A and 11B is a high level flow diagram of a preferred method in accordance with the invention.

10

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Reference now will be made in detail to the presently preferred embodiments of the invention. Such
15   embodiments are provided by way of explanation of the invention, which is not intended to be limited thereto. In fact, those of ordinary skill in the art may appreciate upon reading the present specification and viewing the present drawings that various modifications
20   and variations can be made.

For example, features illustrated or described as part of one embodiment can be used on other embodiments to yield a still further embodiment. Additionally, certain features may be interchanged with similar
25   devices or features not mentioned yet which perform the

same or similar functions. It is therefore intended that

such modifications and variations are included within

the totality of the present invention.

The integrated mobile communications system of the

5   present invention is economical, durable, and easy-to-

use. The system is also flexible in that it permits

changes with regard to definition of the data fields

associated with transmitted data to be instituted

typically by users of the system without any significant

10   or any software modification, thereby precluding the

need for routine input or assistance from an outside

source. It is particularly well-suited to applications

in the transportation industry that involve the delivery

of goods, since the mobile communications device

15   minimizes typing requirements in regard to the shipment

and/or delivery of such goods.

To achieve these features and advantages, a

communication system is provided that transmits data

pertaining to the shipment and/or delivery of goods via

20   a wireless transmission to a remote computing device,

wherein the data is standardized and integrated into a

data file or other format included or associated with an

application program residing on the remote computing

device. The application program can be for example, a

25   payroll system, a billing system, and the like.

27

In accordance with the present invention, the system comprises a data transmission device, preferably mobile, that uses an autotext feature (e.g., macros, objects or other programming techniques) to standardize

5   user entries and minimize user keystrokes. The data transmission device is used to transmit data to a data file or other format included or associated with an application program residing on a remote computing device, while conforming with cost and function

10 constraints.

Specifically, an exemplary embodiment of the present invention includes a handheld data transmission device that sends data via a wireless transmission to a remote computing device. The transmitted data is

15 integrated with a data file or standardized with respect to a predetermined format associated with an application program residing on the remote device. The present invention thus provides a system and method that integrates transmitted data pertaining to delivered

20 goods into a data file or format associated with an application program residing on a remote device such as a computer, as opposed to merely transmitting non-standardized data via, say, an e-mail message.

It is also preferred that the data transmission

25 device contain pre-loaded, standard terms for the

28

autotext entries (i.e., customized vocabulary), but also
allow end-users to enter their own customized vocabulary
on a limited optionally pre-approved basis. The
autotext capability, as will be explained in further

5   detail herein, enables users in a very simple way to
enter information that a computer on the other end can
reliably understand or parse on a prespecified basis.
Users can enter autotext entries directly into the data
transmission device itself, or advantageously download

10   their customized vocabulary to the data transmission
device.

The invention thus enables data to be entered and
transmitted to a remote computing device in a
consistent, cost efficient manner, with minimal

15   programming or customization on the transmission device
(e.g., eLink or other system).

In a preferred embodiment, a gateway is provided
that integrates, formats or prepares the transmitted
data into a data file or other format, message and the

20   like associated with an application program residing on
a remote computing device such as a general purpose
computer. It should thus be understood that the
invention does not merely transmit data via, say, an e-
mail message. Rather, the gateway is used to integrate

25   that data with a data file or message associated with an

application program residing on the remote computing

device. The remote computing device could be a standard

personal computer running in, say a Microsoft Windows or

an NT environment. Alternately, the remote computing

5   device could equally be a standard minicomputer or

mainframe computer.

The gateway receives the messages from, for

example, a network such as the Internet, or a relay

line, and transfers data contained in the messages to a

10   data file associated with an application program

residing on the remote computing device. At least a

portion of the data fields of a data file associated

with the application program residing on the remote

device are populated with at least a portion of the

15   transmitted data. In a preferred embodiment, the

gateway parses the data, thereby facilitating population

of the data fields of the application program.

It is preferred that the gateway reside on the

remote computing device, and comprise a parser that

20   receives the formatted data sent from a data

transmission device that, as previously discussed,

provides for data consistency. To facilitate parsing,

it is preferred that the transmitted data have a

delimiter or other similar marking device or system

25   placed on either side of the data associated with each

transmitted data field. The delimiter can optionally be

any character the user wants.

Further, the invention provides a standardized,

preset autotext vocabulary, as well as the ability for

5   users to customize autotext entries so they can build

their own vocabularies by either a manual or automated

process. The process can be automated, for example, by

installing software that provides this functionality.

The autotext feature minimizes user keystrokes,

10   standardizes data format, and allows users to send data

associated with data fields in any order desired. Thus,

for example, a user could type in bl, which the autotext

feature would expand to bill of lading, and then type in

wgt, which the autotext feature would then expand to

15   weight. Alternately, the user could input wgt and then

bl, each of which again would be expanded by the

autotext feature. The gateway detects what sequence the

fields come in, "grabs" the data in a standardized

manner, and moves it to the proper location (e.g., data

20   file).

It is preferred that user-entered text data is

automatically converted to all upper case letters to

achieve data consistency. Alternatively, all lower case

letters could equally be used, or any combination of

25   upper and lower case letters. The invention also

advantageously simplifies the entry of numeric data. In

many data transmission devices, a function key or a

similar key must be depressed by the user when numeric

data is being entered. The present invention eliminates

5   the need for this by utilizing the name of the fields in

which the numeric data is to be entered. For example,

in the case of the wgt field, the autotext feature of

the present invention knows that numeric data must be

entered, thus relieving the user of having to depress,

10   for example, a function key or similar key when entering

numeric data. The present invention facilitates or

enables a driver to use the data transmission device by

facilitating ease of data entry by, for example,

minimizing typing requirements, and using abbreviations.

15   Therefore, human to computer interaction is facilitated

by the use of this autotext feature.

The features and advantages of the present

invention will be realized by considering the following

conditions particular to the trucking industry. In a

20   trucking environment, if a company wants to start its

billing process, one of two things must typically be

done. The company can wait until a driver returns from

making a delivery and manually submit his billing

information to the billing department (or other

25   designated department in accordance with company

operations), after which time the billing department

enters the data into the billing system. Secondly, the

driver can call and verbally give the information to,

say, a dispatcher, who subsequently enters it into a

5   computer system. Both of these ways are time consuming

and/or tend to occur late in the day. In addition, we

have determined that these methods have resulted in

various data formats that has created much confusion,

and time-consuming efforts in utilizing data entered by

10   drivers or field personnel.

With the present invention, data can be provided in

more timely fashion, and in a consistent format. A

driver can thus transmit the data immediately after a

delivery at, say, 1:00 PM and have the data integrated

15   into the data fields of the application program

associated with or residing on a remote computing device

shortly thereafter instead of having to wait for the

data to be entered when the driver returns at, say, 5:00

PM. The invention thus would provide, for example, a

20   four hour head start in the billing process.

The present invention thus facilitates advance

planning, so that the logistical aspects of matching up

trucking (i.e., shipping/cargo) capacity for a given

shipment to a given destination at a given time can be

25   better accomplished. This advantage will be realized by

the data transfer system of the present invention that

ensures data consistency built around communications

and, enhanced or modified autotext features.

Referring to Figure 4, communication system 200

5   enables a data transmission device 202 to send, via a

wireless transmission, data pertaining to delivered

goods to a remote computing device 204, while conforming

with cost and function constraints. 6. The data

transmission device 202 verifies that the user has

10   entered a valid predefined data field prior to

transmission. The data received by the remote computing

device 206 is subsequently integrated into a data file

or other method of storage associated with an

application program residing on the remote computing

15   device 206. The remote computing device 204, verifies

that a valid data field has been received prior to

utilizing the transmitted data. In a preferred

embodiment, the communication system 200 uses a standard

autotext feature (e.g., macros, objects or other

20   programming techniques) that minimizes user input

requirements and communicates with a second network or

remote computing device 206. It should be understood,

however, that the term data as used in the present

application is not limited to ASCII data, but may also

25   include facsimile data, video data, digital data, text

data, graphical data, and the like.

The present invention can be best understood by the illustrative transportation/trucking industry example described below. However, it should be evident that the

5   present invention can be equally well used in the context of other industries and/or applications wherein field personnel or remote personnel that utilize wireless devices are required to enter data confirming or describing their activities.

10   A preferred embodiment of the communication system 200 according to the present invention is shown in Figure 4. A data transmission device 202 is provided that transfers data, preferably via an e-mail message, to a remote computing system 204 comprising a computing

15   device 206 and a visual display such as a monitor 208. The remote computing device 206 can be any suitable general purpose computer, including mainframe computers, as well as minicomputers or microcomputers. The data flows from the data transmission device 202 through a

20   network 210 to a receiver address, which is accessed by the remote computing device 206. At least a portion of the network 210 is wireless. The remote computing device 206 generally has running thereon application software (e.g., billing software, route planning

25   software, inventory management software, flow management

software, and the like), in addition to the application

software that receives the e-mail and associated data

transmitted by the data transmission device 202. The

remote computing device 206 retrieves data sent by the

5   data transmission device 202, and will typically store

the data on, for example, a disk file (not shown) on the

remote computing device 206. It is preferred that the

data received is parsed, and utilized by a data file

associated with an application program residing on the

10   remote computing device 206, as will be described in

further detail herein.

    The data transmission device 202 may be, for

example, a device such as the standard Research In

Motion (RIM) 850 Wireless Handheld™ Device, which

15   features a keypad (similar to a PC keyboard) for

composing messages, and also allows users to scroll

through messages and menu options without touching a

key. It is preferred that the data transmission device

202 has an autotext feature to minimize keystrokes and

20   thus facilitate ease of use, as will be discussed

herein.

    For purposes of this working example, the following

autotext entries are defined. It is preferred that the

data transmission device 202 have stored therein a

25   plurality of predefined autotext entries that are

readily available to the user. It is also preferred

that the data transmission device provide the user the

capability to define his own autotext entries in a

manner that does not require any third party

5   involvement.

Below is a listing of the significant or important

set of information used in the present invention in

connection with the shipping embodiment of the present

invention:

10   bl = :BILL OF LADING: wgt = :WEIGHT:

shp = :SHIPPER ZIP: cns = :CONSIGNEE ZIP:

pcs = :PIECES: dt: = :DATE:

sgn = :SIGNED BY: pro = :PRO NUMBER:

del = :DELIVERY: pu = :PICKUP:

15   eta = :ETA: cmt = :COMMENT:

d   = :DROP TRLR: dh = :DROP/HOOK:

h   = :HOOK TRLR: osd = :OVER, SHORT OR

DAMAGED:

20   The autotext feature is used to create a delimited

vocabulary specific, for example, to the transportation

industry (e.g., the trucking industry). In the above

example, a colon character (":"), is wrapped in front of

and behind the expanded key words as is thus used as the

25   delimiting character. As noted above, the delimiter may

also be defined by the user.

Several different transmission devices are available that would allow for the communication from remote personnel to a remote computing device

5   communicating the data relating to the pickup and delivery of goods. FIG. 5 is a table showing some examples of autotext tips on one such transmission device, i.e., the RIM 850 pager, incorporated herein by reference.

10   In a preferred embodiment, the subject line of an e-mail sent by a driver is used as a key to determine the type of e-mail being sent. For example, if the driver types pu in the subject line (automatically expanded by autotext to PICKUP), the communication

15   system 200 knows, based on receipt of the subject field and indexing the subject field to predetermined processes and/or predetermined expectations of receiving certain data in a predetermined format, to search for information relative to a pickup. Similarly, del

20   (expanded by autotext to DELIVERY) would indicate a delivery, and osd would be OVER, SHORT OR DAMAGED. The autotext feature of the invention, therefore, allows end users to select the information transmitted as well as reduce the number of keystrokes while entering data, and

25   significantly in a standardized format.

Once the delimited autotext entries are created,
they are utilized with a suitable e-mail or transmission
system (such as the Motient Corp. eLink[SM] system) while
in the "compose an e-mail" function so that the e-mail

5   content (data message) is created with very few
keystrokes. The autotext feature automatically expands
the entries so that they have consistent spelling, and
ensures that that appropriate data is typed into fields
(e.g., that numeric characters are typed into numeric

10   fields, and that text characters are typed into text
fields, the number of characters, minimum/maximum,
format of the characters, etc.). In a preferred
embodiment, the autotext feature also converts all lower
case characters into upper case characters (or vice-

15   versa) within alpha-numeric fields, and ensures that all
required fields are present before the data is
transmitted by the data transmission device 202.

It is also preferred that the communication system
200 be interoperable with a wide variety of proprietary

20   systems. For example, in a preferred embodiment, the
communication system 200 will advantageously recognize
and execute instructions as directed by the IBM
Corporation commands QRYDST, RCVDST SNDMSG, and SNDDST.

It is also preferred that automatic acknowledgements

25   for passed and/or failed messages be sent to the data

transmission device 202.

In a preferred embodiment, remote computing device 206 is unconcerned about a specific field sequence. Therefore, the actual sequence of the fields within the

5   text of the e-mail is irrelevant. A user, therefore, could key in bl for the bill of lading, then the pro number, followed by cmt for comments. Alternatively, the user could key that same information in any other desired sequence. In a preferred embodiment, a program

10   runs on remote computer 206 and identifies what sequence the fields came, utilizes the data that is critical or required, and moves that data to the proper location, such as a data file associated with an application program running on the remote computing device 206.

15

Delivery Message Example

A user sends an e-mail, having typed del in the subject line, which is automatically expanded by autotext to read DELIVERY. In the body of the message,

20   the user types the two characters bl, which is then automatically expanded by the autotext feature to :BILL OF LADING:. The user then types in the actual bill of lading, the format of which can be optionally verified in a number of ways described above, preferably with no

25   spaces, and then types in pro, which is automatically

expanded to :PRO NUMBER:. The user then types in the pro

number assigned to this shipment, which also is

optionally verified.

Thus, a user's typing required to report a delivery

5   amounts to the following keystrokes, once he is on the

subject line of an e-mail:

del bl 123456 pro 1-666543-3

Because the communication system 200 operates

independent of the sequence in which data entries are

10   made, the DELIVERY message can equally assume either of

the following forms:

:BILL OF LADING: 123456 :PRO NUMBER: 1-666543-3

:PRO NUMBER: 1-666544-4 :BILL OF LADING: NB76555

In operation, when the communication system 200

15   locates, for example, the words :BILL OF LADING:, it

knows that whatever follows those words, up until the

next delimiter, is the actual bill of lading, intended

to be processed in some further manner by at least one

other application program residing on the remote

20   computing device 206. With both the bill of lading and

the pro number, an optional edit to confirm the driver

made no typographical errors on a delivery record can be

made.

Pickup Message Example

When a driver makes a pickup, he sends an e-mail with pu in the subject (which expands to PICKUP).

In the body, the driver types:

5   bl, which is automatically expanded to :BILL OF LADING:. The driver then types in the actual bill of lading, with no spaces;

pro, which is automatically expanded to :PRO NUMBER:. He/she then types in, for example, 1-666543-3.

10   wgt which is automatically expanded to :WEIGHT:. He/she then types in the actual shipment weight;

pcs which is automatically expanded to :PIECES:. He/she then types in the number of skids; and

cns which is automatically expanded to :CONSIGNEE

15   ZIP:. He/she then types in the consignee zip code.

Thus, a user's typing required to report a delivery, amounts to the following keystrokes, optionally verified, once he is on the subject line of an e-mail:

20   pu bl NB123456 pro 1-666543-3 wgt 2213 pcs 2 cns 45822

When this message is received by the remote computing device 206, it can be processed locally or, for example, auto-forwarded to, say, a dispatcher, using

25   appropriate commands built-in to the remote computing

42

device 206. The dispatcher would then be aware of a

completed pickup or delivery, with no phone call from

the driver.

When either the PICKUP or DELIVERY message is

5   received at remote computing device 206, the messages

can be read for each of the required fields, and a

response can automatically be sent back to the user. The

message could, for example, indicate that all

information was received or, in the alternative,

10   indicate what information was missing.

Since each user-defined field has delimiters

associated therewith, the contents of the field can be

advantageously readily parsed for subsequent integration

with one or more application programs residing on the

15   remote computing device 206. In a preferred embodiment,

a data queue will receive the data from the e-mail

application program residing on computing device 206.

The data queue will subsequently transmit the data in

the data queue and place it in the appropriate fields of

20   at least one data file associated with at least one

respective application program residing on the remote

computing device 206.

Turning now to Figure 6, the steps of the process

of one embodiment of the invention are shown. In step

25   300, autotext entries are defined. As previously

stated, the autotext entries can be predefined by the

software resident on the data transmission device 202,

or can be defined by the user. In step 302, the user

enters at least one autotext entry and associated data

5   into the data transmission device 202. In step 304, the

user transmits the autotext entry and associated data to

a receiving device such as the remote computing device

206. As discussed above, the receiving device has

application software residing thereon, and has, for

10   example, at least one data file or predetermined format

associated with the application software. In step 306,

the autotext entry and associated data is received by

the receiving device and, in step 308, the data is

incorporated into at least one data file or format

15   associated with the application program running on the

receiving device. In step 310, the user makes a

decision as to whether he wishes to transmit another

autotext entry and associated data. If yes, the user

returns to step 302; if no, the process terminates, as

20   indicated at step 312.

Figure 7 is a flow chart illustrating the process a

driver carries out to report the delivery/pickup of an

item(s). In step 314, the driver receives a request to

either to pickup or to deliver items. The instructions

25   may be received via the transmission device, phone, or

on paper. The driver proceeds to make the

delivery/pickup in step 316. After the pickup/delivery

has been completed, the driver, in step 318, enters,

using autotext, the data pertaining to the shipment into

5   the transmission device. The driver transmits the data

in step 320. In step 322, a remote computing device

receives the transmission from the driver pertaining to

the shipment and determines if the data is complete. If

the data is complete, in step 324 the driver is notified

10   via the transmission device that the data send has

arrived and is complete. The data sent is then

incorporated into an application running on the remote

computing device in step 326. If the data was

determined to be incomplete in step 322, the driver is

15   notified, in step 328, that the data sent was received

but not complete and is instructed to submit the

necessary information.

Figures 8-11 describe additional advantages of the

present invention. Referring now to FIG. 8, the

20   combined agent/messenger gateway system 500 is shown.

The wireless devices 402, 404, 406, the base station(s)

410, the RF/RNC(s) 412, the ARDIS® Connect Engine(s)

(ACEs) 414, and the customer host(s) 408 are each as are

included within FIG. 8. In addition, a plurality of

25   messenger gateways 502 and agent gateways 504 are shown.

In general, there can be one or more messenger gateways
502 and one or more agent gateways 504. The messenger
502 and agent 504 gateways are each connected, directly
or optionally indirectly via, for example a gateway
5   server 505, to an ACE 414. The gateways 502, 504 are
also connected to a network 506 such as the Internet,
and a registration system 518. The registration system
518 contains the required profile for each user, as will
be explained in further detail herein, and is preferably
10 connected to an Internet server, which allows users to
optionally modify user information such as times at
which they wish their wireless device 402, 404, 406 to
retrieve messages from a server 512. One or more
customer host computers 408 are connected to the
15 Internet, and may optionally be connected to a messenger
gateway 502. Finally, one or more e-mail servers 512 are
connected to the Internet 506.

One optional difference between the messenger
gateways 502 and the agent gateways 504 lies with the
20 addressing scheme. The messenger gateways 502 (and
wireless devices 402, 404, 406 associated therewith)
operate with their own unique Internet domain name,
comprised of at least an organization's or an
individual's name combined with a top level domain name.
25 Top level domain names can include: a) .com; b) .net; c)

.org; d) .edu; e) .gov; f) .mil; and g) .int. Other top
level domain names can also be used as they become
available (e.g., .firm, .store, .arts, etc).

In a preferred embodiment, the domain name is
5   @2way.net, although it will be readily recognized that
domain names other than @2way.net can optionally be
used. The end user has the option of what the <username>
portion of the <username>@2way.net address will be, and
can preferably change the <username> portion at any time
10   in the registration system 518 via Internet server 516.
The messenger gateways 502 thus preferably perform
operations on messages having a domain name associated
with the system 500 (e.g., in the case of the Motient^SM
network 400, an @2way.net domain name), whereas the
15   agent gateways 504 preferably perform operations on
messages having any domain name. Other methods of
altering the functionality are also possible. For
example, the functionality can be optionally distributed
among the agent 504 and messenger 502 gateways as well.
20   The system 500 provides a wide variety of messaging
services. For example, the messenger gateways 502 offer
the power of two-way e-mail messaging, as well as
optional facsimile (fax) and paging capabilities. Users
can thus send messages to, for example, other wireless
25   devices 402, 404, 406, to PC's 510 or similar devices

via the Internet 506, as well as a text message to a fax

machine 514. In a preferred embodiment, a wireless

device such as a RIM™ 850 model wireless handheld device

will be utilized, which can also receive and/or transmit

5   pages via the network 500.

In a preferred embodiment, users who may use, for

example, a POP and/or IMAP e-mail account(s) residing

on, for example, a desktop/laptop PC 510 as their

primary desktop e-mail are provided the convenience of

10   utilizing a wireless device 402, 404, 406 to check their

PC 510 account messages as will be discussed in further

detail. The agent gateways 504 in conjunction with

wireless devices 402, 404, 406 thus operate as an

"extension" of, for example, a user's personal and/or

15   corporate e-mail address/account. The agent gateways 504

preferably operate on a polled basis, checking, for

example, a user's personal and/or corporate e-mail

account when a user manually makes a request or

automatically on a predetermined automatic basis (e.g.,

20   every 60 minutes).

Messaging Between Wireless Devices

The operation of the system 500 can be best

described and illustrated by providing several examples.

25   The system 500 can, for example, be used to send a

message from one wireless device 402, 404, 406 to

another wireless device 402, 404, 406. Although only two

subscriber devices 402, 404, 406, are explicitly shown,

any number consistent with network 500 capacity may be

5   provided. The user inputs to his wireless device 402,

404, 406 the destination address of a second wireless

device 402, 404, 406 to which he wishes to send a

message. The message is then transmitted via a RF

transmission to base station 410. Once received at a

10   base station 410, the, message is preferably transmitted

via a wireline network to a RF/RNC 412, and then

preferably transmitted to an ACE 414. At this point,

depending on what the recipient's address is, the

message is then routed, via a gateway server 505, to

15   either a messenger gateway 502 or an agent gateway 504.

It should be understood, however, that the base stations

410, RF/RNCs 412 and ACEs 414 are not required, as such,

to practice the invention. That is, any suitable

transmission path and/or means for transmitting that

20   enables the RF signals emitted by the wireless devices

402, 404, 406 to reach a messenger gateway 502 and/or

agent gateway 504, or equivalents thereof, is all that

is required.

In the case of peer-to-peer messaging (i.e., where

25   the originator and recipient of the message both

subscribe to a same network such as the Motient^{SM}

network 400), the message is advantageously routed to

either a messenger gateway 502 or an agent gateway 504,

without any substantial delay. Such a determination will

5   generally be made by considering factors such as network

traffic and loading of the respective gateways. Once

received at either a messenger 502 or agent 504 gateway,

the message is "turned around", without being routed

through the Internet 506, and routed back through a

10   gateway server 505, an ACE 414, an RF/RNC 412, a base

station 410, and finally to a recipient wireless device

402, 404, 406.

Desktop to Wireless Device Messaging

15   Another type of message that can be transmitted by

the system 500 is one that is initiated from a desktop

e-mail system such as a PC 510, and destined for a

wireless device 402, 404, 406. If the wireless device

402, 404, 406 has an @2way.net domain name, the message

20   is routed over the Internet 508 to the wireless device

402, 404, 406 via a messenger gateway 502, gateway

server 505, an ACE 414, a RF/RNC 412, and a base station

410. Optionally, direct connectivity of, for example, a

customer host 408 to a messenger gateway 502 is

25   possible. Here, the message is routed from the user's PC

510 via a customer host 408 to a messenger gateway 502,

a gateway server 505, and then out through an ACE 414, a

RF/RNC 412, and base station 410 for broadcasting to the

wireless device 402, 404, 406. With either a standard

5 transmission via a network such as the Internet 506 or

via direct connectivity to a messenger gateway 502, the

transmission path to a messenger gateway 502 is based on

the fact that the message has been addressed to a

predetermined address, e.g., <username>@2way.net

10 address, which is the domain for the messenger gateways

502. Thus, in a preferred embodiment, an address

originating from, say, a PC 510 and destined for a

recipient having an e-mail address of the form

<username>@2way.net address will be transmitted from the

15 PC 510, through a messenger gateway 502, a gateway

server 505, an ACE switch 414, a RF/RNC 412, a base

station 410, and finally to the designated wireless

device 402, 404, 406.

As previously noted, both the agent gateways 504

20 and the messenger gateways 502 advantageously have

direct connection to the Internet 506. However, other

embodiments in the present invention provide that the

messenger gateways 502 and/or agent gateways 504 receive

the messages from other modules or components in the

25 system. For example, an agent gateway 504 may have

direct connectivity to the Internet 506 and transfer

messages to a messenger gateway 502, and/or vice versa.

Retrieving Messages from Another Account

5   Another example of a message transmission involves

the use of a wireless device 402, 404, 406 to retrieve

messages from, for example, a user's POP3 and/or IMAP 4

e-mail account residing on, say, a PC 510. Here, the

wireless device 402, 404, 406 is preferably configured

10   to poll the user's e-mail mailbox residing on, for

example, a POP and/or IMAP server 512 at a fixed time or

time interval (e.g., 5:00 P.M. and/or every 35 minutes).

Alternatively, the wireless device can poll the user's

server 512 when manually directed to so by the user by,

15   for example, clicking a "Get Mail" icon. In either case,

an agent gateway 504 can access the user's mailbox

residing on a server 512 via a network such as the

Internet 506, pull any message therein, and store them

on an agent gateway 504. The messages can then routed

20   via gateway server 505 to an ACE 414, a RF/RNC 412, a

base station 410, and then to the user's wireless device

402, 404, 406 that has the address associate with that

particular mailbox. This addressing and mapping of the

user's wireless device 402, 404, 406 to the user's POP

25   and/or IMAP e-mail account(s) is preferably done through

the registration system 518, which contains the required

profile for each user.

The agent gateways 504 thus merge a user's Internet

504 e-mail mailbox residing on a server 512 with the

5   wireless device 402, 404, 406 to retrieve, either

automatically on a predetermined basis or manually as

directed by the user, mail from the user's POP and/or

IMAP e-mail account(s). The agent gateway 504 thus

enables a user to utilize the same e-mail address as

10   their POP and/or IMAP e-mail account. This also allows a

user to, for example, respond to received e-mail

messages from their wireless device 402, 404, 406 such

that the messages look like they are being sent from the

user's PC 510. In a preferred embodiment, any messages

15   sent from a wireless device 402, 404, 406 are duplicated

into a user's "Sent Mail" folder on server 512 when

using the IMAP.

The system 500 allows users to have, for example,

two e-mail accounts: one that utilizes a messenger

20   gateway 502 to send and receive messages substantially

immediately, and one that utilizes an agent gateway 504

for sending and receiving messages on a polled basis.

The user can provide e-mail addresses associated with

the respective accounts to various people, thereby

25   providing enhanced flexibility as to how soon messages

are received. Optionally, the agent gateways 504 and/or

messenger gateways 502 allow a single user to hold two

or more e-mail accounts (e.g., a work account and/or a

personal account), and route e-mail from both either or

5   both accounts to a single wireless device 402, 404, 406.

Having these two e-mail addresses allows a user,

for example, to not be interrupted by messages coming

through an agent gateway 504. This feature is provided

by allowing the user to optionally and advantageously

10   select when he wants to receive his messages. For

example, the user can specify that he only wants to

receive messages, for example, when he logs on and

downloads them, or at a particular time (e.g., 5:00

P.M.). In such a case then, if the user is in a meeting

15   at 2:00 P.M., he would then know that the message he has

received is a message sent via a messenger gateway 502.

In a corporate setting, an employee who has a

wireless device 402, 404, 406 and does not want, need,

or currently have access to a corporate e-mail account

20   can utilize the wireless device 402, 404, 406 in

conjunction with his home e-mail system. Alternatively,

employees who are away from the office may use a

wireless device 402, 404, 406 to receive messages via a

messenger gateway 502, particularly if they do not have

25   either a home or work e-mail account from which they can

retrieve their messages via an agent gateway 504.

Paging Service

The paging service operates in manner similar to
the e-mail service. As previously noted, it is preferred
that a wireless device such as a RIM™ 850 model be
utilized, which can also receive and/or transmit pages
via the network 500. Thus, depending on whether the
user, via the registration system 518, sets the page up
to utilize an agent gateway 504 or a messenger gateway
502, the user can receive pages on either a real time or
polled basis. Specifically, if the user chooses via the
registration system 518 to have page messages utilize a
messenger gateway 502, the user will receive pages via
the wireless device 402, 404, 406 on a real time basis.
Similarly, if the user chooses via the registration
system to have page messages utilize an agent gateway
504, the user will receive pages on a polled basis, as
determined by the user.

In a preferred embodiment, a page intended for a wireless device 402, 404, 406 is generated from a standard numeric paging system such that when that message goes out to either the messenger gateway 502 or

5   agent gateway 504, the page message looks like an e-mail message that is addressed to a wireless device 402, 404, 406 having an address of the form <username>@2way.net domain name. The text of the message will be the numbers that were keyed through the numeric paging system.

10

Facsimile Service Via Agent Gateway

Advantageously, the present invention, in accordance with one embodiment, enables a user to transmit a facsimile from a wireless device 402, 404,

15   406 to a facsimile device 514. By connecting the agent 504 and messenger 504 gateways together, a facsimile message can be transmitted from a wireless device 402, 404, 406 to a facsimile device 514 via a transmission path that includes a messenger gateway 502 (which does

20   not have a faxing capability) and an agent gateway 504 (which does have a faxing capability). Previously, if an agent gateway 504 was not connected to a messenger gateway 502, a fax could not have been transmitted from a wireless device 402, 404, 406 via an agent gateway

25   502, since messenger gateways 502 do not have a faxing

capability. From a functional standpoint, the capability

of the agent gateways 504, which are polling gateways

that include functionality that enable facsimile

transmissions, are advantageously combined with the

5   messenger gateways 502 used by wireless devices 402,

404, 406.

In operation, a wireless device 402, 404, 406,

originates a facsimile message for a device 514. When a

phone number for the facsimile device 514 is entered in

10   the wireless device 402, 404, 406, the message is

transmitted to a base station, an RF/RNC 412, an ACE

414, and subsequently to a messenger gateway 502. Since

messenger gateways 502 do not have facsimile

functionality, messenger gateways 502, which are

15   operatively communicable with an agent gateway 504,

transmit the facsimile message to an agent gateway 504.

An agent gateway 504 then transmits the facsimile

message to the facsimile device 514 via, for example the

Internet 506. The facsimile transmission path can

20   optionally include, for example, a customer host 408.

POP Service

Turning now to FIG. 9A, a preferred high level

embodiment of proxy server architecture 600, utilized in

25   conjunction with the proxy server 505, is shown. The

architecture 600 preferably works with at least POP
and/or IMAP protocols. It should also be understood that
the architecture 600 can accommodate both present and
future version of the POP and IMAP protocols, as well as

5   newly developed protocols used in transmitting and/or
receiving e-mail and/or other wireless and/or electronic
messages.

The scheduler 610 determines which, if any, of the
wireless devices 402, 404, 406 are active. The scheduler

10   610 also, via the registration system 518, determines
when each particular wireless device 402, 404, 406
registered with the system 500 is set to retrieve
messages from an e-mail server 512. That is, the user
may specify, via the registration system 518, that his

15   messages be downloaded to his wireless device 402, 404,
406 on either a manual basis (e.g., a user specifically
perform one or more commands to retrieve messages), or
automatically on a predetermined basis (e.g., every 30
minutes). In the case of retrieving messages on a

20   predetermined basis, the user optionally sets the
time(s) at which he wishes his messages to be retrieved
via the registration system 518. The user may change
these settings at any time so that messages, for
example, are retrieved at different times and/or time

25   intervals, or retrieved manually.

In operation, the scheduler 610 notifies the
download manager 620 via the device action manager 640
at the proper time for each wireless device 402, 404,
406. The scheduler 610 preferably accesses subscriber

5   information to determine, for example, user specified
download time(s) for each respective wireless device
402, 404, 406. Once the action for a particular user(s)
is determined, the scheduler 610 notifies the device
action manager 640.

10   The message lookup manager 620 is preferably
optimized for downloading messages from a server 512 for
worst case scenarios (e.g., 1000 messages in mailbox on
server 512 with only one being a new message that needs
to be downloaded). In a preferred embodiment, an

15   identifier is associated with each user (e.g., a user
ID), and a message identifier identifies each message
(which is unique across various sessions for a given
user) for each user that has been downloaded. The lookup
manager 620 is also responsible for deleting records

20   when corresponding messages are deleted from the user's
mailbox storage on server 512.

In a preferred embodiment, the lookup manager 620
will access, for example, a message ID associated with
each user message stored on an e-mail server 512. Each

25   message ID associated with each user ID is unique. That

is, the combination of the user ID and the message ID is
preferably unique. Other unique identification systems
or techniques may alternatively be used for the messages
to be sent to specific individuals. Alternatively, or in
5   combination, non-unique identifiers may be used. The
lookup manager 620 accesses the message IDs associated
with each message on an e-mail server 512, compares
those IDs with the ID's of messages that have already
been downloaded to the Proxy server 505, and downloads
10   only those messages associated with message IDs that
have not already been downloaded. In an alternative
embodiment, when using IMAP, the lookup manager may
simply access the last message ID downloaded and, in
accordance with the IMAP, download from an e-mail server
15   512 those messages having a higher message ID number
than the last message ID number downloaded. If desired,
lower numbers can also be utilized to identify messages
that have not been downloaded.

The message download manager 650 downloads new
20   messages from servers 512 once new messages have been
identified by the lookup manager 620. The download
manager 650 waits for notifications from the scheduler
610 and the lookup manager 620.

The message processor 670 retrieves raw (i.e.,
25   messages in server 512 format such as POP or IMAP)

messages, interprets the message format received from
the server 512 mail format (e.g., POP, IMAP, etc.), and
normalizes that message format to the Proxy server 505
message format, and stores the message(s) for subsequent

5   processing. After storing the message, the gateway
server 505 is notified to take action to transmit the
message to the designated wireless device 402, 404, 406.

       Turning now to FIG. 9B, a more detailed embodiment
of the POP service architecture 600 is shown. Since the

10   architecture 600 in accordance with the present
invention potentially serves a large number of clients
at any given time, there will generally be any number of
servers 512. The servers 512 are preferably either POP
and/or IMAP based servers, or other suitable hardware

15   and/or protocol based system.

       Since there may be a large number servers 512 and
concurrent connections thereto, volume handling and
scalability are important design criteria. Such volume
handling and scalability are preferably addressed by

20   providing a scheduler 610 that has a scheduling
algorithm. The scheduler 610 determines which, if any,
of the wireless devices 402, 404, 406 are active.
Wireless devices 402, 404, 406 may be inactive for the
obvious reason that they are not activated (e.g., turned

25   off), or because they, for example, are in a designated

coverage zone but cannot connect to the system 500

because of a building or other obstruction that prevents

a RF signal of the wireless device from establishing

contact with a base station 410. For wireless devices

5   402, 404, 406 to be active, they must be "connected" to

the system 500 in the sense that they are able to send

and/or receive messages thereto and/or therefrom.

As previously discussed, the scheduler 610 also,

via the registration system 518, determines when each

10   particular wireless device 402, 404, 406 registered with

the system 500 is set to retrieve messages from an e-

mail server 512. That is, the user may specify, via the

registration system 518, that his messages be downloaded

to his wireless device 402, 404, 406 on either a manual

15   basis (e.g., a user specifically perform one or more

commands to retrieve messages), and/or automatically on

a predetermined or real time basis (e.g., every 30

minutes). In the case of retrieving messages on a

predetermined basis, the user optionally sets the

20   time(s) at which he wishes his messages to be retrieved

via the registration system 518. The user may change

these settings at any time so that messages, for

example, are retrieved at different times and/or time

intervals, or retrieved manually.

25   Wireless device 402, 404, 406 profiles are created

and preferably maintained in a subscriber information

database 614, which is preferably accessed by the

registration system 518. The scheduler 610 is preferably

based on subscriber configuration and activity contained

5   in the subscriber information database 614. In addition

to containing information pertaining to the user

specified preferred delivery method (e.g., manual or

predefined times), the subscriber information database

614 also preferably contains information pertaining to

10   subscribers' POP and/or IMAP e-mail account such as:

user name/identification, user password, user e-mail

address, user display name, server name, etc. The

subscriber profiles in the subscriber information

database 614 are preferably accessible at least via the

15   servers 512, the agent gateways 504, and the Internet

506.

In operation, the scheduler 610 notifies the

download manager 620 via the device action manager 640

at the proper time for each wireless device 402, 404,

20   406. The scheduler 610 preferably accesses the

subscriber information database 614 to determine the

user specified download time(s) for each respective

wireless device 402, 404, 406. Upon receiving such

notification, the scheduler 610, preferably uses a

25   scheduling algorithm and device activity and

63

configuration information contained in subscriber

database 614 to decide on the action that needs to be

taken. Once the action is determined, the scheduler 610

notifies the device action manager 640.

5   The system 500, in a preferred embodiment, does not

store messages permanently since virtually all POP and

IMAP servers 512 provide storage for holding an

unlimited number of messages for an unlimited period of

time. The agent gateways 504 thus preferably store

10   messages downloaded from a server 512 for a limited time

period (e.g., 72 hours). When wireless devices 402, 404,

406 check for new mail on a server 512, any new messages

on a server 512 must be differentiated from old messages

(i.e., messages already downloaded to a wireless device

15   402, 404, 406), as the agent gateway 504 does not

download all messages residing on a server 512, but only

those that have not yet been downloaded. To solve this

problem, the system 500 can to store and access some

minimal "lookup" information about all messages on the

20   servers 512.

As previously discussed, the message lookup manager

620 is therefore preferably optimized for performance

for worst case scenarios (e.g., 1000 messages in mailbox

on server 512 with only one being a new message that

25   needs to be downloaded). The lookup information database

628 stores an identifier associated with each user
(e.g., a user ID) and a message identifier that
identifies each message (which is unique across various
sessions for a given user) for each user that has been

5   downloaded. Database 628 is generally useful across
various sessions of the service, but within a given
session, using database 628 would have an adverse impact
on performance. Therefore, in a preferred embodiment, a
minimal, just in time, in-memory lookup information

10   table 624 is provided. The lookup manager 620 is also
responsible for deleting records from the lookup table
and in-memory data structures when corresponding
messages are deleted from the user's mailbox storage on
server 512.

15   In a preferred embodiment, the lookup manager 620
will access, for example, a message ID associated with
each user message stored on an e-mail server 512. Each
message ID associated with each user is unique. That is,
the combination of the user ID and the message ID is

20   unique. The lookup manager 620 accesses the message IDs
associated with each message on an e-mail server 512,
compares those IDs with the ID's of messages that have
already been downloaded to the proxy server 505, and
downloads only those messages associated with message

25   IDs that have not already been downloaded. In an

alternative embodiment, when using IMAP, the lookup

manager may simply access the last message ID downloaded

and, in accordance with the IMAP, download from an e-

mail server 512 those messages having a higher message

5   ID number than the last message ID number downloaded. If

desired, lower numbers can also be utilized to number

messages that have not been downloaded.

The database lookup manager 622 thus accesses, for

example, a message ID or other unique message identifier

10   associated with each stored message on a server 512, and

compares these messages with the message IDs of messages

already downloaded to the agent gateway 502, as provided

by the lookup info table 624. In a preferred embodiment,

database 628 stores in a fixed medium (e.g., a hard

15   drive, CD-ROM, tape drive, and the like) the data

contained in the lookup info table 624 in the event of a

system 500 failure. The device queue 626, preferably

resident in memory, maintains a list of wireless devices

402, 404, 406 for which action needs to be taken. For

20   example, if ten wireless devices 402, 404, 406 have

requested and/or are scheduled to check their messages

on their respective servers 512 as determined by the

scheduler 610, the database lookup manager 622 will

access the device queue 626 to retrieve such

25   information.

The message download manager 650 downloads new

messages from servers 512 once new messages have been

identified by the lookup manager 620. The download

manager 650 waits for notifications from the scheduler

5   610 and the lookup manager 620. Once the input

notifications are processed, the download manager 650

directs worker threads 660 as will be described herein.

Since the system 500 needs to connect to and

communicate with various servers 512 in parallel, the

10   preferred embodiment uses a multi-threaded approach.

Hence, to create and optimally manage these threads a

thread pool manager 654 is preferably used. Optionally,

other implementations such as standard thread pool

manager classes could equally be used. The thread pool

15   manager 654 receives information from the device action

manager 640, accesses the state of wireless device 402,

404, 406 from the device queue 658, and directs the

worker threads 660 in downloading messages from a server

512 associated with the wireless device 402, 404, 406

20   under consideration in the device queue 658.

Regarding the worker threads 660, the Winsock

(WINdows SOCKets) transport 664 is a standard

application programming interface (API) between a

Windows application and the TCP/IP protocol. Most TCP/IP

25   stacks designed to run under Windows and most Windows

software that communicates via TCP/IP is Winsock

compliant. The Winsock routines are preferably

implemented as a dynamic link library, and the

WINSOCK.DLL file is included with the Windows operating

5   system. The Winsock transport 664 is used to communicate

between the download manager 650 and various servers

512.

The download protocol identifier 666 identifies

which download protocol is used by the server (e.g.,

10   POP, IMAP, etc.). The connection handler 662 connects to

a specific server 512 associated with the wireless

device 402, 404, 406 currently in the device queue 658

and downloads any new message(s) identified by the

message lookup manager 620, as previously described. The

15   connection handler 662 also optionally identifies the

type of connection to the server 512 (e.g., internet

506, dedicated line, virtual public network (VPN),

etc.).

Messages downloaded from a server 512 are

20   preferably stored in a raw message queue 630 via the

output handler 668. The raw message queue is provided in

a preferred embodiment since there will generally be

differences between the processing speed of the download

manager 650 and the message processor 670.

25   The message processor 670 retrieves messages (e.g.,

messages in server 512 format such as POP or IMAP) from

the message queue 630, parses the messages, and creates

a message object using the message interpreter 672. Once

a message is retrieved from a given server 512, the

5   message needs to be interpreted from the server 512 mail

format (e.g., POP, IMAP, etc.), normalized to the Proxy

server 505 message format, and stored in a database 630

for subsequent processing. The process of retrieving,

normalizing, and storing a message will generally take

10   longer than simply downloading the message. Therefore,

the database 630 also serves as a raw message queue. The

device action manager 640 maintains the state

information of the message lookup manager 620 and user

information associated with each wireless device 402,

15   404, 406 contained in the device queue 626.

Once the message is interpreted, it is normalized

to the Proxy server 505 message format by the eLink^{SM}

message normalizer 674, and stored in a database 630.

After storing the message, the agent gateway 504 can

20   transmit the message to the designated wireless device

402, 404, 406, and the raw message queue manager 630 is

notified to remove message from its queue, each by the

persistence and notification handler 676.

FIG. 10 shows an exemplary block diagram of the

25   combination system 700. FIG. 10, which is similar to

FIG. 11, shows the integrated architecture of the agent

gateway 504. Specifically, the agent gateway 504 now

shows the POP service architecture 600 as previously

discussed with regard to FIGs. 9A and 9B. The integrated

5   system 700 provides the functionality and advantages of

real time and/or polled delivery of e-mail messages,

faxing and paging as described heretofore.

FIG. 11 is a flow chart illustrating the steps

performed by the combination system 700 when a user uses

10   a wireless device 402, 404, 406 to retrieve messages

from a server 512. In step 800, wireless device 402,

404, 406 profiles are created and maintained in a

subscriber database 614. The profiles include

predefined autotext entries. The subscriber database 614

15   preferably contains information pertaining to the

subscribers' POP and/or IMAP e-mail account(s) such as:

user name/identification, user password, user e-mail

address, user display name, server name, etc.

In step 802, one or more e-mail servers 512 receive

20   one or more messages. The messages can be associated

with one or more user's, where each user can have one or

more e-mail accounts. As previously discussed, the

messages stored on server 512 are preferably of a POP

and/or IMAP format. In step 804, when a wireless device

25   402, 404, 406 is programmed or manually directed to

retrieve messages stored on server 512, the agent

gateway 504 is contacted via a base station 410, a

RF/RNC 412, an ACE 414, and a gateway server as shown in

FIG. 6. Alternatively, server 512 may transmit/broadcast

5   messages directly or without the wireless device

specifically requesting.

In step 806, the scheduler 610 stores the

identification of each wireless device 402, 404, 406

that has requested a download in the device action

10   manager 640. In step 808, the device action manager

notifies the message download manager when each wireless

device 402, 404, 406 has requested action.

In step 810, the thread pool manager 654 within the

message download manager 650 is activated. As previously

15   discussed, the thread pool manager 654 receives

information from the device action manager 640, accesses

the state of wireless device 402, 404, 406 from the

device queue 658, and directs the worker threads 660 in

downloading messages from a server 512 associated with

20   the wireless device 402, 404, 406 under consideration in

the device queue 658.

In step 812, the download manager 650, as

previously discussed, utilizes the message lookup

manager 620 to differentiate between any messages on a

25   server 512 that have not been downloaded to an agent

71

gateway 504. In step 814, the message download manager

650 downloads any new messages from a POP and/or IMAP

server 512. While the message download manager 650

retrieves the computer messages from a server 512, the

5   agent gateway 504 may continue to receive additional

requests from other wireless devices 402, 404, 406 via

the scheduler 610. In a preferred embodiment, user

messages stored on server 512 are preferably identified,

for example, by a message ID and/or a destination

10   address of the computer messages, such as the user's e-

mail addresses. As previously discussed, the user's

account information may also include such information as

a password associated with the user's account. The

account information will also include when the wireless

15   device wishes to receive messages (e.g., 9:00 AM and

5:00 PM).

Next, in step 816 the message processor 670

interprets (e.g., converts, formats, etc.) via the

message interpreter 672 the message received from a

20   POP/IMAP server to the agent gateway 504 message format.

In step 818, an agent gateway 504 is notified to take

action on this message by the persistence and

notification handler 676. Finally, in step 820, the

message in the raw message queue 630 is deleted by the

25   persistence and notification handler 676.

An alternative network configuration is illustrated in U.S. Patent 6,219,694 incorporated herein by reference.

The many features and advantages of the invention

5   are apparent from the detailed specification, and thus, it is intended by the appended claims to cover all such features and advantages of the invention which fall within the true spirit and scope of the invention. Further, since numerous modifications and variations

10   will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation illustrated and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope

15   of the invention. While the foregoing invention has been described in detail by way of illustration and example of preferred embodiments, numerous modifications, substitutions, and alterations are possible without departing from the scope of the

20   invention defined in the following claims.